WOODTURNING HOLLOWING BASIC PROJECT

NOTE: Read this instruction a few times, until you are quite familiar with the procedure. Take a look at the suggested videos to gain a good idea of the methods used by other woodturners.

This is an instruction of how to begin making hollow vessels. For your initial project, it describes the procedure for turning a drinking 'glass', suitable for coffee, tea etc.

Material / Tools required:

1 piece: 3” (76mm) x 3” (76mm) x 6” (150mm). Use hard Maple, Cherry, Beech or Birch. Open grained wood such as Ash or Oak are not suitable for this project. Softwood such as Pine, Spruce etc are also not suitable for this project.

Finish: good quality oil finish, salad bowl finish or bees wax.

Tools:

Spindle roughing gouge or bowl gouge

Parting tool or Bedan

Hollowing tool options:

Spindle gouge, hollowing scraper(s), hook tool, ring tool

Finishing tools:

1/2” square box scraper

3/4” round scraper

Measuring tools:

Calipers, suitable for measuring wall thickness and tenons.

Lets start...

1 Place the wood blank between centres and turn your blank round, using a spindle roughing gouge or bowl gouge.

2 At the headstock end, using a parting tool or bedan, make a tenon 2” (50mm) round and 1/2” (12mm) tall. If your woodturning chuck has dovetail jaws, angle the tenon to fit.

3 Mount the tenon in a woodturning chuck (dimensions will fit most manufacturer's #2 jaws. Do not use a metal machinist's chuck as it will not reliably hold.

4 Square off and clean up the end of the blank with a parting tool, bedan or spindle gouge – whatever you are comfortable using.

5 Shape the outside of your 'drinking glass' before hollowing. Do not remove any 'lower' than the bottom of the 'drinking glass'. Make the shape simple – a straight cone shape, with the 'bottom' about 4 inches (100mm) away from the face. Make the 'bottom' diameter 1/2” (13mm) smaller than the rim. This will make a straight sided vessel, similar in shape to a coffee shop disposable. Finish sand down to the bottom as this will be difficult later.

6 Adjust the toolrest across the face of the blank. Set the height so that your hollowing tool cutting edge will be at the centre of the workpiece when level or slightly tipped down.

7 Begin hollowing. For details of how to work with different tools, refer to the following videos that are available on YouTube.

7.1 Spindle gouge technique: https://www.youtube.com/watch?v=ijZ8Ph8KWcw

7.2 Advanced spindle gouge technique: https://www.youtube.com/watch?v=4zz8r7zhnSg

7.3 Scraper technique: https://www.youtube.com/watch?v=g5T1y7C5j0Q

7.4 Hook tool technique: https://www.youtube.com/watch?v=oyDNAGu0rxU

8 Hollowing steps (start only after you understand all the steps). You have finished the outside to 4” (100mm) from the face. Hollow the inside to 3.5” (90mm). This will make it easier to finish / part off the piece later. Leave the wall thickness at least 1/8 inch (3mm). You can taper the last little bit at the rim.

8.1 Measure wall thickness frequently. As soon as you are not sure where you are – measure – even if this means you do it after each pass. Use calipers such as those noted at the beginning of this article.

8.2 Finish turning the rim BEFORE hollowing. If you damage the rim – fix immediately as you will not be able to do so after hollowing is completed.

8.3 Hollow about one third of the depth at a time. Use your hollowing tool to remove stock, then use a 'cleanup' tool (e.g. Scraper, spindle gouge wings etc) to remove tool marks). Finish sand as you go. Do not 'go back' to clean up previously completed sections. The wood may – and probably will – change shape slightly and any attempt to deal with this will usually end in disaster.

8.4 Once you reach about half way, readjust the toolrest so that your hollowing tool(s) and scraper(s) are slightly angled downwards when the cutting tip is at the workpiece centre.

8.5 When you reach the bottom – close to 4 inches (100mm) for this project, smaller diameter tools will vibrate, sometimes severely. Use larger diameter hollowing tools and wider/thicker scrapers to counteract this effect. 1/2” (13mm) detail gouges (spindle gouge with increased metal under the flute) may reach the bottom of your piece with minimal vibration.

8.6 Clean up the bottom with a scraper. Do this with very light passes – easy to get a catch the further your cutting edge is away from the tool rest!

8.7 For this project, it is not important to have a 'flat' bottom, a slight curve is quite acceptable.

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9 Now that your piece is hollowed out and the inside is finish sanded.... It's time to part off and finish the bottom.

10 It's time to part off the finished piece. Leave extra thickness at the bottom, it will be removed later. Make the parting gap fairly wide so that you can leave a centre 'cone' shape that fits into your live centre that has it's centre pin removed. Do not remove the remaining wood from the chuck – you need it in the next step.

11 If the diameter of the remaining wood in the chuck is more than 1/2” (13mm) larger than the top of your 'glass', turn a groove in the face that snugly fits the top of your glass and clean up the bottom – you will use it to make a cover for your 'glass' later. Have it shaped for a firm – but not really tight fit to the inside of the 'glass'. Make it about 3/16” (4.5mm) deep. You will use this to drive the piece when finishing the bottom. If the remaining wood is too small, proceed to steps 18, 19 and 20 before doing steps 11 through 17 by using a waste block large enough for step 11.

12 Accurately measure the depth of the inside. Mark this depth on the outside. You do not want to blow out the bottom at this point now, do you?

13 Fit the piece to the jam chuck you made in step 11 and bring up the tailstock (with the pin removed from the live centre). Step 10 will have left a 'stem' that fits inside the live centre hole. This will accurately centre your piece. Do not put a lot of pressure on the piece as you will be making the bottom fairly thin.

14 Using a spindle gouge, begin finishing the bottom by making only light cuts. Cuts end at the 'cone' at the live centre. Since you marked where the bottom of the inside is located, you can turn the base thickness to approximately equal the wall thickness. It's o.k. to make the bottom a little thicker than the walls.

15 Finish sand the bottom as far as you can.

16 When the bottom is finished up to the live centre diameter, start removing wood between the live centre and the piece bottom. Go as far as you dare – then stop, cut the remainder with a saw to part off the piece or carve off with a knife. Leave the remaining wood in the chuck, you are not done with it yet.

17 Carve off the nub that remains on the bottom of your 'glass' and finish sand the centre.

18 You have a snug fit groove in the wood that remains in the chuck. Finish sand the bottom and check that the fit to the 'glass' is snug.

19 Turn the outside of the 'cap' to slightly overhang the outside edge of the 'glass' and allow for at least 1/4” (6mm) thickness for the cap.

20 Make a groove in the cap that is at least 1/2” (12mm) wide with a parting tool or bedan. Deepen the groove until only about a 1/2” (12mm) diameter remains. Finish sand the 'cap' as far as you can. Part off the cap, carve away the nub and finish sand the centre.

21 Now, for the wood finish. If being used for cold/room temperature liquids, almost any food safe finish is acceptable. If the piece will be used for hot liquids, a 'salad bowl' finish will not survive as it contains varnish which will eventually peel away from the wood. A 'food safe' penetrating oil finish is acceptable for cold or hot liquids, but will require at least two weeks to 'cure' followed by hand washing with dish washing detergent a few times to remove any finish after taste. You can take the easy way out by not using any finish on the inside of the 'glass'. Just apply a penetrating oil finish to the cap and the outside of the 'glass', leave for two weeks in a warm place, wash a couple of times before using.

22 Applying finish

22.1 Penetrating oil finish: apply according to manufacturer's directions. Choose a finish that is penetrating, cures in a short period of time and contains VOC's that evaporate quickly and completely.

22.2 Salad Bowl finish: apply according to manufacturer's directions. Note that this type of finish should not be used with hot liquids.

22.3 No finish to inside of 'glass': apply a penetrating oil finish (according to manufacturer's directions) to the outside of the 'glass' and to all sides of the cap. Leave for two weeks for the VOC's to evaporate, then wash a couple of times with dish washing detergent before using. Note that this method allows you to use the 'glass' for cold or hot liquids.

Videos:

Spindle gouge hollowing technique: (note good for shallow hollowing (up to 4 inches / 100mm) deep)
https://www.youtube.com/watch?v=ijZ8Ph8KWcw

Advanced spindle gouge hollowing technique:
https://www.youtube.com/watch?v=4zz8r7zhnSg

Hook tool hollowing technique:
https://www.youtube.com/watch?v=oyDNAGu0rxU

Further Reading:

Kurt Hertzog Hollowing article:
http://kurthertzog.com/articles/wt_280_81_86_how_to_do_that_tfmbJR.pdf

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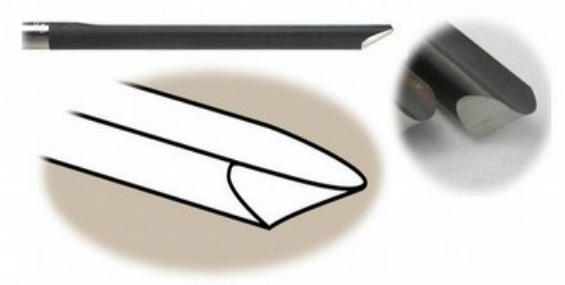
Hollowing tools images:



Shallow spindle gouges a.k.a. 'detail gouge'. An excellent choice for hollowing as the extra material below the flute allows a 1/2” (13mm) tool to be used to a depth of 4” (100mm).

Spindle gouges shown with two different grinds. The fingernail grind is more suitable for hollowing. Standard 1/2” (13mm) spindle gouges are useful to about 3” (76mm).

One style of round carbide cutter tip hollowing tool that have a tapered shaft. Larger diameter shaft allows a small cutter to be used farther into work.

A more 'standard' type of carbide tip in a round shaft.

Unique design that allows more freedom of movement inside the hollow vessel.

This type of cutter is good for removing wood quickly. It is also available mounted on an angle to the supporting shaft for under cutting.

One type of ring cutter – works similar to a hook tool.

Examples of different types of shafts to hold cutters

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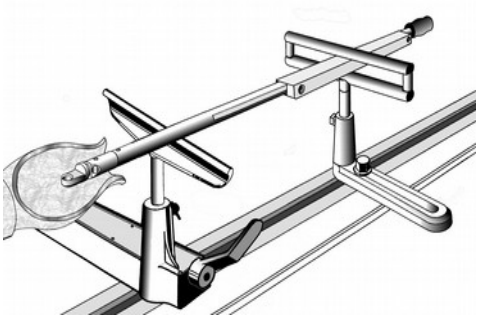
Andre Martel style hook tools. These are made as cutting tips that are inserted into shafts.

Standard shaped hook tools. These can be fairly easily made with a minimum of 'blacksmiths' tools or facilities.

'Open' type of hook tool. This tool is harder to control when hollowing, more suitable for bowl work.

Oneway ring tool. This tool is supplied with a sharpening jig.



Typical deep hollowing system. These are available in various sizes. Hollowing beyond 9” (230mm) requires increasing the tool tip supporting shaft diameter to increase. Some of these systems have shafts over 2” (50mm) in diameter for hollowing up to 36” (900mm).

This hollowing system includes a steady-rest to hold fragile pieces while working deeper.

This system eliminates the capture 'slot' by using an articulated support system.